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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO ACID MILLING

(*First Revision*)

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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO ACID MILLING

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 15 June 1988, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 This standard was first published in 1957 and has been revised on the basis of experience gained during its use. Changes have been made in the sampling, preparation of composite specimen, apparatus and procedure so as to bring it in line with other similar standards on colour fastness tests.

0.3 Colour fastness of textile materials is of considerable importance to the consumer. The fastness depends not only upon the nature and depth of shade of the dyestuff used but also upon the nature of the fibre and the method of dyeing or printing employed; the same colouring matter, when used in dyeing or printing different fibres or when applied by different methods upon the same fibre, may give vastly different results. Formulation of standard methods of test for determining colour fastness of textile materials to different agencies likely to effect change in colour is, therefore, necessary.

0.4 The method of test prescribed in this standard is intended for evaluating colour fastness of textile materials to the action of dilute and hot mineral acids as used in the hat-making and felt industries and also in the manufacture of blanketing and service materials.

1. SCOPE

1.1 This standard prescribes a method for the determination of colour fastness of textile materials of all kinds and in all forms to the action of dilute and hot mineral acids as used in milling.

2. PRINCIPLE

2.1 A specimen of the textile in contact with adjacent fabrics is milled in a container containing steel balls and a solution of sulphuric acid. The severity of the action is standardized by means of a test control dyeing milled separately in the same way. The change in colour of the specimen and the staining of the adjacent fabrics are assessed with grey scales.

3. SAMPLING

3.1 Sample to determine conformity of a lot of coloured textile material to a specification shall be selected so as to be representative of the lot.

3.2 Sample drawn in compliance with the relevant material specification or as agreed to between the buyer and the seller to evaluate colour fastness of the material in the lot shall be representative of the lot.

4. COMPOSITE SPECIMEN

4.1 Two Adjacent Fabrics — each measuring 10 cm × 4 cm, one piece made of the same kind of fibre as that of the textile to be tested, or that predominating in the case of blends, the second piece made of the fibre as indicated below or in the case of blends, of the kind of fibre second in order of predominance, or as otherwise specified:

If the First Piece is	*Second Piece to be*
Cotton	Wool
Wool	Cotton
Linen	Wool
Viscose	Wool
Acetate	Wool
Polyamide	Wool
Polyester	Wool
Acrylic	Wool

4.2 Preparation of Composite Specimen

4.2.1 If the textile to be tested is fabric, place a specimen 10 cm × 4 cm between the two adjacent fabrics and sew along all four sides to form a composite specimen.

4.2.2 If the textile to be tested is yarn, knit or weave it into fabric and treat it as in **4.2.1** or form a layer of parallel lengths of it between the two adjacent fabrics, the amount of yarn taken being approximately equal to half the combined mass of the adjacent fabrics. Sew along all four sides to hold the yarns in place and to form a composite specimen.

4.2.3 If the textile to be tested is loose fibre, comb and compress an amount approximately equal to half the combined mass of the adjacent fabrics into a sheet 10 cm × 4 cm. Place the sheet between the two adjacent fabrics and sew along all four sides to hold the fibre in place and to form a composite specimen.

4.2.4 Prepare the composite specimen of the test control in the way outlined for fabric in **4.2.1**.

5. APPARATUS

5.1 Suitable Mechanical Device — consisting of water bath containing a rotatable shaft which supports, radially, glass or stainless steel containers (75 ± 5 mm diameter × 125 ± 10 mm high) of approximately 550 ± 50 ml capacity, the bottom of the containers being 45 ± 10 mm high from the centre of the shaft. The shaft/container assembly is rotated at a speed of 40 ± 2 rev/min. The temperature of the water bath is thermostatically controlled to maintain the test solution at the prescribed temperature ±2°C.

Suitable devices are:

a) Launderometer, as described in the Technical Manual of the American Association of Textile Chemists and Colourists (AATCC).

b) Linitest, as described in Mellian Textilberichts 49 (1968), 6, pp. 709-711.

c) Wash wheel sponsored by the Society of Dyers and Colourists.

NOTE — Other mechanical devices may be used for the test provided that the results are identical to those obtained with the apparatus described above.

5.2 Non-corrodible (Stainless) Steel Balls — 6 mm diameter.

5.3 Test Control — A dyeing of CI Acid Blue 7 (Colour Index, 3rd edition) on wool cloth. A well wetted-out pattern of wool serge is entered at 40°C into a dye-bath containing 3 percent CI Acid Blue 7, 10 percent sodium sulphate decahydrate ($Na_2SO_4 \cdot 10H_2O$) and 3 percent sulphuric acid [relative density (sp. gr.) 1·84], all percentage being calculated on the mass of the wool, at a liquor ratio of 1 : 40.

The dye bath is raised to the boil in 30 minutes and continued for 45 minutes. The pattern is removed, rinsed and dried.

5.4 Grey Scales — for evaluating change in colour and staining.

6. REAGENTS

6.0 Quality of Reagents — Unless otherwise specified, pure chemicals shall be employed in tests and distilled water (*see* IS : 1070 - 1977*) shall be used where the use of water as a reagent is intended.

NOTE — Pure chemicals shall mean chemicals that do not contain impurities which affect the test results.

6.1 Sulphuric Acid Solution — containing 50 g of concentrated sulphuric acid [relative density (sp. gr.) 1·84] per litre of distilled water.

7. PROCEDURE

7.1 Carry out the operations described in **7.2** to **7.6** with the composite specimen and the composite test control specimen, in parallel in separate baths.

7.2 Put the composite specimen and the composite test-control specimen in separate containers in the device each with three times its own mass of the milling solution and 50 stainless steel balls. Run the device for 2 h at 40 ± 2°C.

7.3 Add sufficient distilled water at 40 ± 2°C to give a liquor ratio of 1 : 40 and run the device for an additional 10 minutes.

7.4 Remove the composite specimen, rinse twice in cold distilled water, then rinse for 10 minutes in cold running tap water. Open out the composite specimen by breaking the stitching on all sides except one of the shorter sides and dry it by hanging in air in shade at a temperature not exceeding 60°C with the three parts in contact only at the remaining line of stitching.

7.5 Assess the change in colour of the test control and the staining of adjacent fabrics with grey scales. If the change in colour is not equal to rating 3 on the appropriate grey scale, the test has not been carried out correctly, and the operations described in **7.1** to **7.4** should be repeated with a fresh composite specimen and a fresh composite test-control specimen (*see* Note under **7.6**).

7.6 Assess the change in colour of the specimen and the staining of adjacent fabrics with grey scales.

NOTE 1 — Treated test specimen or the test control should have cooled after drying and should have regained their normal moisture content before evaluation.

NOTE 2 — In cases of doubt in the colour fastness rating as assessed by an observer, the assessment should be done by at least three observers and the overall average rating should be reported.

8. REPORT

8.1 Report the numerical rating for change in colour of the test specimen and the numerical ratings for staining of the two pieces of adjacent fabrics used in the preparation of the composite specimen.

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*Specification for water for general laboratory use (*second revision*).

The Central Electric Press, Delhi-7